

09/995,931
POV-892

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
27 January 2005 (27.01.2005)

PCT

(10) International Publication Number
WO 2005/008539 A1

(51) International Patent Classification⁷: G06F 17/30

(21) International Application Number:
PCT/US2004/022148

(22) International Filing Date: 9 July 2004 (09.07.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/486,517 11 July 2003 (11.07.2003) US

(71) Applicant (for all designated States except US): COM-
PUTER ASSOCIATES THINK, INC. [US/US]; One
Computer Associates Plaza, Islandia, NY 11749 (US).

(71) Applicants and

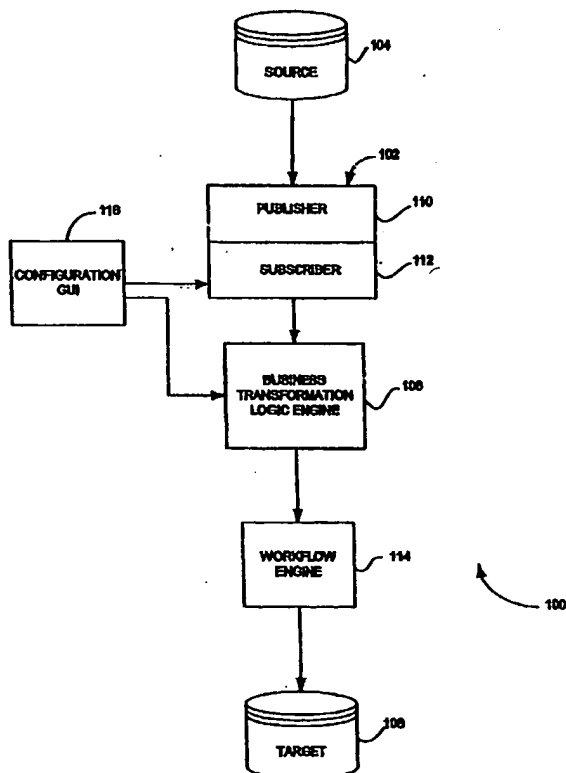
(72) Inventors: FERNANDEZ, Jesus [US/US]; 71 Upper
State Street, North Haven, CT 06473 (US). SULLI-
VAN, Catherine, Elizabeth [US/US]; 110 Northwood
Boulevard, Central Islip, NY 11722 (US). QUI, Kejian
[US/US]; 1081 South Meridan Road, Cheshire, CT 06410
(US). JACOBSON, Ronald [US/US]; 330 Elm Street,
Meriden, CT 06450 (US).

(74) Agents: SCHMIDT, Joseph, W. et al.; Carter, DeLuca,
Farrell & Schmidt, LLP, Suite 225, 445 Broad Hollow
Road, Melville, NY 11747 (US).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,

[Continued on next page]

(54) Title: SYSTEM AND METHOD FOR MANAGING USER DATA IN A PLURALITY OF DATABASES



(57) Abstract: A system and method for integrating data from a source application to a target application includes an interface module incorporating a publisher for publishing extracted data in an XML message and subscriber for uncompressing the XML message. The method includes the steps of publishing an XML message of user data from the source application; receiving, decoding and uncompressing the XML message; and transforming the XML message into a workflow request for integrating the source data to the target application.

WO 2005/008539 A1



TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report

- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

SYSTEM AND METHOD FOR MANAGING USER DATA IN A PLURALITY OF DATABASES

CROSS REFERENCE TO RELATED APPLICATIONS

5 This application claims priority to a provisional application entitled "SYSTEM AND
METHOD FOR MANAGING USER DATA IN A PLURALITY OF DATABASES" filed
in the United States Patent and Trademark Office on July 11, 2003 and assigned Serial No.
60/486,517, the entire contents of which are hereby incorporated by reference. This
application is also related to U.S. provisional application Serial Nos. 60/486,512 and
10 60/486,508, each filed on July 11, 2003, the entire contents of each of these applications also
being incorporated by reference.

BACKGROUND

1. Field

15 The present invention relates generally to database management systems, and more
particularly, to a system and method for managing user data in a plurality of databases.

2. Description of the Related Art

20 Driven by new Internet technologies, business growth requires organizations to
extend their systems, applications and directories to partners, suppliers, customers and
employees. This explosion in user population makes the task of managing user accounts
increasingly complex. It also creates a new need for identity management—the ability to
control and monitor individual user access over time.

Compounding this situation are the business realities of mergers, acquisitions and divestitures — the numbers of users are increasing and the numbers of system types are expanding. IT directors are forced to manage multiple operating systems, mail systems, network operating systems and home-grown applications distributed across various, often
5 worldwide locations.

Individually managing multiple directories is time-consuming, costly and error-prone — especially in organizations where changes frequently occur. Keeping up with the daily maintenance can be a significant task. Ensuring overall security and integrity across the board increases the challenge.

10 To meet these challenges, administrative security systems have been developed to provide user account management across multiple, geographically dispersed security systems and directories. An example of one such system is eTrust™ Admin commercially available from Computer Associates International, Inc. of New York, the assignee of the present application. These systems enable the creation, modification and removal of users
15 across multiple, heterogeneous environments. The single administrative security system allows administrators to centrally define and manage security policies across an enterprise by automating the provisioning of user accounts on a variety of IT systems and ERP (Enterprise Resource Planning) applications, for example, using a role-based approach. That is, role-based user provisioning enables the administrators to automatically provide users
20 with a set of userids based on their business functions and ensures consistent user access policies are applied across a wide range of system types and directories.

With the advances in centralizing the administration of user accounts, there remains a need for techniques for extracting data from directories and ERP applications to populate the administrative security systems without manually reentering the existing data.

5 SUMMARY

A system and method for managing user data in a plurality of databases is provided. The system and method extracts user data from a source application, repository or database, transforms the user data into global user data, and sends the global user data to a target
10 application capable of managing the global user data across various environments.

According to an aspect of the present invention, an interface module for integrating data from a source application to a target application is provided comprising a publisher for publishing the extracted data in an XML message; and a subscriber for uncompressing the XML message. The publisher includes a full data replication mechanism for initially
15 publishing the entire content of the source application and an incremental updates mechanism for publishing changes made to the source application after initial publication.

In another aspect, the subscriber is a Java subscriber.

In a further aspect, the subscriber includes an EDI engine for uncompressing the XML message when a number of XML messages is greater than a first predetermined
20 threshold.

According to another aspect of the present invention, a method for integrating data from a source application to a target application is provided. The method comprises the steps of publishing an XML message of user data from the source application; receiving, decoding

and uncompressing the XML message; and transforming the XML message into a workflow request for integrating the source data to the target application.

In a further aspect of the present invention, a program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform method steps for integrating data from a source application to a target application is provided, the method steps comprising publishing an XML message of user data from the source application; receiving, decoding and uncompressing the XML message; and transforming the XML message into a workflow request for integrating the source data to the target application.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other aspects, features, and advantages of the present invention will become more apparent in light of the following detailed description when taken in conjunction with the accompanying drawings in which:

FIG. 1 is a block diagram of an exemplary system for managing user data in a plurality of databases in accordance with an embodiment of the present invention;

FIG. 2 is a block diagram of an interface module in accordance with an embodiment of the present invention;

FIG. 3 is a block diagram of a business transformation logic (BTL) engine in accordance with an embodiment of the present invention;

FIG. 4 is a flow diagram illustrating a method for managing user data in a plurality of databases in accordance with an embodiment of the present invention; and

FIG. 5 is an overall flow diagram illustrating a system and method for managing user data in a plurality of databases, where a source application or repository is a PeopleSoft™ application and a target application or repository is eTrust™ Admin.

5 DETAILED DESCRIPTION

Preferred embodiments of the present invention will be described hereinbelow with reference to the accompanying drawings. In the following description, well-known functions or constructions are not described in detail to avoid obscuring the invention in unnecessary detail.

10 A system and method for managing user data in a plurality of databases is provided. The system and method extracts user data from a source application, repository or database, transforms the user data into global user data, and sends the global user data to a target application capable of managing the global user data across various environments.

15 FIG. 1 is a block diagram of a system for managing user data in a plurality of databases. Generally, the system 100 includes an interface module 102 for extracting user data from a source application 104 and a business transformation logic (BTL) engine 106 for transforming the user data into a format usable by a target application 108. The interface module 102 includes a publisher 110 for extracting user data, e.g., employee data, from the source application 104. The publisher 110 publishes an XML message from the extracted
20 user data and sends it to a subscriber 112. The subscriber 112 receives, decodes, and uncompresses the XML message. The subscriber 112 then sends the data to the BTL engine 106 that creates a MessageContext object with XML messages and sends it through a chain of BTL handlers, which will be described in detail below. From the BTL handlers, the object is sent to a workflow engine 114 where a request is created and sent to the target application

108. Depending on the request, the target application 108 creates, modifies, or deletes global users, their accounts, or changes the roles associated with a global user. Additionally, a configuration GUI (graphical user interface) 116 is provided for a user, e.g., an administrator, to define the information to be transformed from the source application 104 to the target application 108.

It is to be understood that the present invention may be implemented in various forms of hardware, software, firmware, special purpose processors, or a combination thereof. In one embodiment, the present invention may be implemented in software as an application program tangibly embodied on a program storage device. The application program may be uploaded to, and executed by, a machine comprising any suitable architecture. Preferably, the machine is implemented on a computer platform having hardware such as one or more central processing units (CPU), a random access memory (RAM), a read only memory (ROM) and input/output (I/O) interface(s) such as a keyboard, cursor control device (e.g., a mouse or joystick) and display device. The computer platform also includes an operating system and micro instruction code. The various processes and functions described herein may either be part of the micro instruction code or part of the application program (or a combination thereof) which is executed via the operating system. In addition, various other peripheral devices may be connected to the computer platform such as an additional data storage device and a printing device.

Additionally, it is to be appreciated that the system and method may be implemented on several machines coupled together over a network, e.g., a local area network (LAN), a Wide Area Network (WAN), the Internet, etc.. For example, the interface module may be

implemented on a first machine while the business transformation logic engine may be implemented on a second machine.

It is to be further understood that, because some of the constituent system components and method steps depicted in the accompanying figures may be implemented in software, the actual connections between the system components (or the process steps) may differ depending upon the manner in which the present invention is programmed. Given the teachings of the present invention provided herein, one of ordinary skill in the related art will be able to contemplate these and similar implementations or configurations of the present invention.

An embodiment of the present invention will be described below using a PeopleSoft™ application as the source application and Computer Associates' eTrust™ Admin as the target application with reference to FIGS. 2 and 3, where FIG. 2 is a graphical representation of a PeopleSoft™ eTrust™ Admin Interface (PETAi) module 202 and FIG. 3 is a block diagram of the BTL engine 306. It is to be appreciated that although the embodiment described below references PeopleSoft's HRMs (Human Resources Management System), the principles of the present invention will apply to other source applications and is not limited to that described below.

The main purpose of PETAi module 202 is to interface with PeopleSoft™ and to feed the PeopleSoft™ data onto the BTL Engine 306. The feed process will take place using two different mechanisms: Full Data Replication and Incremental Updates. The Full Data Replication process will be used to seed, or initially populate or repopulate, a copy of the entire sub-set of PeopleSoft™ records and fields exported onto eTrust™ Admin. The Incremental Updates mechanism will keep eTrust™ Admin current, with changes made on

the master PeopleSoft™ data. Incremental updates will contain only the records where the data has been modified.

The PETAI module 202 will be implemented using PeopleSoft™ Enterprise Integration technology, specifically using Application Messaging 211, and will be loaded into the PeopleSoft™ application. PeopleSoft™ Application Messaging is based on a "publish-and-subscribe" model that enables a third party external system to integrate with PeopleSoft™ applications via XML/HTTP(S) messages.

The PETAI module 202 includes a publisher 210 and a subscriber 212. The publisher mechanism 210 will be deployed onto PeopleSoft™ and will publish and deliver the XML messages to eTrust™ Admin subscriber 212. The PETAI module 202 will comprise two separated publisher mechanisms, one for implementing the Full Data Replication 210-1 and one for the Incremental Updates 210-2. The eTrust™ Admin subscriber mechanism 212 will be deployed onto the PeopleSoft™ Application Messaging Gateway 211 and will capture, transform and pass the XML messages onto the BTL engine 306. Additionally, the PETAI module 202 will include a PETAI Message Node, a PETAI Message Channel and PETAI Message definitions. The message node and channel are the common objects shared by all message definitions. The PETAI node will be the connection point to eTrust Admin. PETAI node will be defined as an external node pointing to the Application Messaging Gateway servlet, where the PETAI Java subscriber 212 is registered and deployed. The PETAI message channel is a common object that groups all PETAI message definitions. Routing rules within PETAI message channel will route PETAI published messages to the PETAI message node. Message definitions will be defined separately for each publisher mechanism.

The Incremental Updates Publisher mechanism 210-2 will subscribe to internal application messages that synchronize Peoplesoft™ database components when changes are being made to the PeopleSoft™ records and fields. Then, it will build the PeopleSoft™ XML message(s) and populate it (them) with the data, and finally publish it (them) onto the eTrust™ Admin subscriber 212. The Full Data Replication Publisher mechanism 210-1 will query all the defined PeopleSoft™ records and fields to get a full copy of data, then it will build the PeopleSoft™ XML message(s) and populate it (them) with the data, and finally publish it (them) onto the eTrust™ Admin subscriber 212.

Many PeopleSoft™ application tables are effective-dated, meaning that historical and future-date rows may be present on the table. eTrust™ Admin does not use effective dating so the PETAI module 202 will need to filter and provide only the current or active information before feeding it onto eTrust™ Admin. This filtering process will take place in the publisher 210 and needs to be implemented for both full data replication and incremental updates publisher mechanisms.

The PETAI module 202 will define a sub-set of PeopleSoft™ records and fields that will be published and delivered to the eTrust™ Admin subscriber 212. This definition will be taken from the PeopleSoft™ Message definitions(s) that will carry on the data to eTrust™ Admin. Separated PeopleSoft™ message definitions will be created for the full data replication and incremental updates publishers.

The subscriber 212, e.g., a Java subscriber, will be deployed and registered into the PeopleSoft™ Application Messaging Gateway Servlet. It will be in charged of capturing, decoding and uncompressing any XML messages delivered to eTrust™ Admin, and passing them onto the BTL engine 306. Transformations will change the format used in the XML

message from a PeopleSoft™ format to an eTrust™ Admin format. The Java subscriber 212 will also integrate with the PeopleSoft™ Application Messaging Config Servlet. The Config servlet will allow the administrator to load/unload the PETAI Java subscriber 212 as well as configuring PeopleSoft™ Nodes to be subscribed from. Integration code will interface with the Config servlet APIs including a HTML graphical user interface for the Java subscriber configuration.

To handle a large amount of transactions, e.g., a large XML message, the Java subscriber 212 will process incremental updates and full data replication messages separately. A transactions threshold will be the mechanism used to determine the type of a message. A threshold=1 will mean that only messages with one transaction are considered an incremental update type. Messages with more than one transaction will belong to the full data replication type. This threshold will be a configuration parameter set to 1 by default. Incremental update messages will be passed to the BTL engine for immediate processing. Full data replication messages will be copied to a file where a separate process will process them. This second process is implemented by an EDI (Electronic Data Interchange) engine.

The EDI engine will be a separated process/thread that will monitor the folder where full data replication messages are copied as files. It will have a separate instance of the BTL engine and once it finds a new file to process, it will create a MessageContext object using the XML data from the file and it will pass it on to the BTL engine to process it.

Once the subscriber 212 transforms the user data from the source application, the data is passed to the BTL engine 306. The purpose of the BTL engine 306 is to provide a means to transform the input PeopleSoft™ data coming from the PETAI module 202 into Workflow request(s). This request(s) will lead towards the provisioning, modification or de-

provisioning of an eTrust™ Admin Global user and all associated accounts. The transformation will be performed by a series of BTL handlers that will be invoked by the BTL engine 306, as shown in FIG. 3. The invocation process will follow a pre-determined order previously specified in the configuration GUI. Each BTL handler will receive, apply
5 its transformation and pass onto the next handler, a MessageContext Object. The MessageContext object is a structure, which will contain the PeopleSoft™ data in an XML format among other parts.

The BTL engine 306 will enable the administrator to determine and assign Roles to Global Users based on PeopleSoft™ data; to calculate and assign custom data fields to
10 Global User attributes, for example, to generate a user id using two or more PeopleSoft™ data fields and some specific business rules; to map data elements within the XML buffer to Global User Attributes; to access custom code and/or third party code to set Global User attributes; etc.

The BTL engine 306 will comprise a chain of handlers including a sample template
15 handler 330, XSL files handler 332, business rules handler 334, mapping handler 336, and generic component handler (Dirsync Handler) 338.

The template handler 330 will serve as a starting point for the end user to develop custom BTL handlers for transforming data.

The XSL handler 332 will allow the end user to transform the input XML message
20 based on a chain of XSL (Extensible Stylesheet Language) files. The stylesheet must be provided a separated file containing the XSL Transformation code (no need to re-compile Java code). To get a hold of the XSL file, this handler will use a parameter in a configuration file containing an ID for the stylesheet, the name of the XSL file and an order

number to be applied. For example, a PSCAMA (PeopleSoft™ Common Application Message Attributes) handler may have an entry as follows:

```
5      <xsl-entry>
        <stylesheet-id>pscama</stylesheet-id>
        <stylesheet-filename>pscama.xsl</stylesheet-filename>
        <stylesheet-order>1</stylesheet-order>
      </xsl-entry>
      <xsl-entry>
10     <stylesheet-id>sample</stylesheet-id>
        <stylesheet-filename>sample.xsl</stylesheet-filename>
        <stylesheet-order>2</stylesheet-order>
      </xsl-entry>
```

15 The PSCAMA XSL program will provide the functionality to filter PSCAMA and data records in the XML message. The filtering code will use an audit action field (AUDIT_ACTN) at the PSCAMA record to filter the data records in the XML message. Logic will be as follows:

The data record will be included in the output if

- PSCAMA record not present for a specific data record
- PSCAMA record is present and AUDIT_ACTN is set to 'A' or 'C' or 'N' or

20 A sample XSL program will also be provided. It will serve as a starting point for the end user, e.g. administrator, to develop custom XSL programs.

25 The business rules (BR) handler 334 enables the user to create a set of decision tables that match their specific needs. A decision table is a set of business rules that determine the assignments of special Global User attributes required in the user provisioning process. Special Global User attributes can be roles, profiles, groups, or any other attribute requiring special treatment to determine its value. Decision tables present a sophisticated mechanism to set special attributes without having to write any code.

For each special Global User attribute an administrator may want to assign, the administrator will create one decision table. Each decision table needs to specify a set of input parameters to be used in the calculation of the attribute value. A decision table header enables the administrator to provide this information. The header's first column is where the output field name is to be placed. Valid output field names are considered any field name on the ETRUST_ADMIN record. The rest of the header columns are where the input parameters are to be placed. Valid input parameters are considered any field on the XML message and must be defined using XPath standard syntax.

The decision table rows are where the business rules are defined. Each row specifies the output value, the combination of comparison values, and operators for assigning the value. The first column on each row is where the output value is placed. The rest of the row columns are where the comparison values and the operators are placed. Valid comparison values are any real value in the PeopleSoft™ database and valid comparison operators are '=' (equal) and '!=' (not equal).

The following decision table example assigns the Global User Role attribute (Role-Name) and uses three input parameters to calculate the value (Country, Department ID, and Company). The sample defines two business rules for assigning two different role values.

Role-Name	PERSON/PERSONAL _DATA/COUNTRY	PERSON/JOB /DEPTID	PERSON/JOB /COMPANY
Namerica_HR_GBI_Role	=USA	=HR	=GBI
International_Role	!=USA		

The following is the above decision table in XML format:


```

<decision-table-entry>
  <decision-table-id>roles</decision-table-id>
  <header>
    <header-output>
      <header-field-name>Role-Name</header-field-name>
    </header-output>
    <header-input-entry>
      <header-position>0</header-position>
      <header-xpath>PERSON/PERSONAL_DATA/COUNTRY</header-xpath>
    </header-input-entry>
    <header-input-entry>
      <header-position>1</header-position>
      <header-xpath>PERSON/JOB/DEPTID</header-xpath>
    </header-input-entry>
    <header-input-entry>
      <header-position>2</header-position>
      <header-xpath>PERSON/JOB/COMPANY</header-xpath>
    </header-input-entry>
  </header>
  <rows>
    <row-entry index="0" >
      <row-output>
        <row-field-value>NAmerica_HR_GBI_role</row-field-value>
      </row-output>
      <row-input-entry>
        <row-position>0</row-position>
        <row-comparison-value>USA</row-comparison-value>
        <row-comparison-operator>=</row-comparison-operator>
      </row-input-entry>
      <row-input-entry>
        <row-position>1</row-position>
        <row-comparison-value>10000</row-comparison-value>
        <row-comparison-operator>=</row-comparison-operator>
      </row-input-entry>
      <row-input-entry>
        <row-position>2</row-position>
        <row-comparison-value>GBI</row-comparison-value>
        <row-comparison-operator>=</row-comparison-operator>
      </row-input-entry>
    </row-entry>
    <row-entry index="1" >
      <row-output>
        <row-field-value>International_role</row-field-value>
      </row-output>
      <row-input-entry>
        <row-position>0</row-position>
        <row-comparison-value>USA</row-comparison-value>
        <row-comparison-operator>!=</row-comparison-operator>
      </row-input-entry>
    </row-entry>
  </rows>

```



```

5      </rows>
      </decision-table-entry>
      <decision-table-entry>
        <decision-table-id>groups</decision-table-id>
        <header>
          <header-output>
            <header-field-name>Group-Name</header-field-name>
          </header-output>
          <header-input-entry>
            <header-position>0</header-position>
            <header-xpath>PERSON/PERSONAL_DATA/COUNTRY</header-xpath>
          </header-input-entry>
        </header>
        <rows>
15      <row-entry index="0" >
          <row-output>
            <row-field-value>NAmerica_group</row-field-value>
          </row-output>
          <row-input-entry>
            <row-position>0</row-position>
            <row-comparison-value>USA</row-comparison-value>
            <row-comparison-operator>=</row-comparison-operator>
          </row-input-entry>
        </row-entry>
20      <row-entry index="1" >
          <row-output>
            <row-field-value>International_group</row-field-value>
          </row-output>
          <row-input-entry>
            <row-position>0</row-position>
            <row-comparison-value>USA</row-comparison-value>
            <row-comparison-operator>!=</row-comparison-operator>
          </row-input-entry>
        </row-entry>
25      </rows>
      </decision-table-entry>
35

```

The business rules handler 334 then sends the message to the mapping handler 336.

The BTL mapping handler 336 associates one PeopleSoft™ data field or a custom
 40 record field to a Global User attribute of the eTrust™ Admin application. The mapping
 supports the association of any element and any non-element within the XML message to a
 Global User Attribute using XPath standard syntax.

The mapping of attributes will be defined by XML data stored in the configuration file. The end user can customize the XML data to fit their specific needs using the configuration GUI. The configuration file will use XPath standard syntax to define the mappings having the root element as the context for all definitions.

5 The following XML data represents a sample PeopleSoft™ XML message:

```

10  <MsgData>
    <Transaction>
        <PERSONAL_DATA class="R">
            <EMPLID>C10001</EMPLID>
            <NAME>Stankowski,Richard</NAME>
            <LAST_NAME>Stankowski</LAST_NAME>
            <FIRST_NAME>Richard</FIRST_NAME>
            <MIDDLE_NAME></MIDDLE_NAME>
15  <COUNTRY>USA</COUNTRY>
            <ADDRESS1>11308 Wildflower Lane</ADDRESS1>
            <ADDRESS2></ADDRESS2>
            <ADDRESS3></ADDRESS3>
            <ADDRESS4></ADDRESS4>
20  <CITY>Grass Valley</CITY>
            <COUNTY></COUNTY>
            <STATE>CA</STATE>
            <POSTAL>97077</POSTAL>
        </PERSONAL_DATA>
25  <JOB_ETA_VW class="R">
            <EMPLID>C10001</EMPLID>
            <DEPTID>13000</DEPTID>
            <DESCR>Finance</DESCR>
            <JOBCODE>KU067</JOBCODE>
30  <JOBCODE_DESCR>Sr Accounts Payable Clerk</JOBCODE_DESCR>
            <LOCATION>KUDE00</LOCATION>
            <LOCATION_DESCR>Delaware Operations</LOCATION_DESCR>
            <EMPL_STATUS>T</EMPL_STATUS>
            <COMPANY>GBI</COMPANY>
35  <BUSINESS_UNIT>GBIBU</BUSINESS_UNIT>
            <BUSINESS_TITLE></BUSINESS_TITLE>
            <SUPERVISOR_ID></SUPERVISOR_ID>

        </JOB_ETA_VW>
    </Transaction>
40 </MsgData>

```


For example, mapping definitions for “EMPLID” and “DEPTID” elements will be represented using XPath standard syntax as:

```

5      <eta21-attribute-mapping>
      <custom-element-xpath>PERSONAL_DATA/EMPLID</custom-element-xpath>
      <attribute-name>eTUserid</attribute-name>
      <attribute-mod-flag>overwrite</attribute-mod-flag>
      </eta21-attribute-mapping>
10     <eta21-attribute-mapping>
      <custom-element-xpath>PERSONAL_DATA/EMPLID</custom-element-xpath>
      <attribute-name>eTGlobalUserName</attribute-name>
      <attribute-mod-flag>overwrite</attribute-mod-flag>
      </eta21-attribute-mapping>
15     <eta21-attribute-mapping>
      <custom-element-xpath>JOB_ETA_VW/DEPTID</custom-element-xpath>
      <attribute-name>eTDepartment</attribute-name>
      <attribute-mod-flag>overwrite</attribute-mod-flag>
      </eta21-attribute-mapping>

```

20 The generic component handler 338 will be the end point in the BTL engine chain and ultimately will transform the PeopleSoft™ data into Workflow requests.

Among other functions, the configuration GUI 116 will be employed to configure the various BTL handlers. The purpose of the configuration GUI 116 is to provide a means for a system administrator to easily define the information that is needed in order to transform a
25 PeopleSoft™ User Entry into an eTrust™ Admin Global User Entry. This information will include the resulting eTrust™ Admin Global User attributes and the means that is used to produce them.

The BTL configuration GUI 116 will be comprised of the following interfaces:

- 30 • **BTL Handlers Registration:** This interface will allow the end user to register BTL handlers on the BTL engine and define their invocation order.
- **Attribute Mapping Interface:** This interface will allow the end user to define the mapping parameters used by the BTL Mapping Handler.
- **Decision Tables Interface:** This interface will allow the end user to create and add decision tables to be executed by the BTL Business Rules Handler.

- **General Configuration:** This interface will allow the end user to set all remaining configuration parameters.

It is worth noting that to define the mappings and the BR decision tables specific meta-data will be required. This meta-data will be needed for both eTrust™ Admin and PeopleSoft™. In the case of PeopleSoft™, it will consist of the attributes that can be used as parameters to the Decision Table Definitions. In the case of eTrust™ Admin, this data will consist of a list of all supported Global User attributes. There will be two ways that the PeopleSoft™ data can be obtained from the BTL Configuration GUI. The first is by using a PeopleSoft™ Extract. From an existing extract, the BTL configuration GUI will be able to obtain the required meta-data. At any time, the system administrator will be able to add to and modify this meta-data. In the case of eTrust™ Admin meta-data, a listing of the attributes that exist will be readily available from the configuration GUI. In the BTL Configuration GUI, the eTrust™ Admin meta-data may be modified as well.

With reference to FIGS. 4 and 5, a method for managing user data in a plurality of databases will be described illustrating the data flow where the source application is a PeopleSoft™ application and the target application is eTrust™ Admin.

The PETAI module 502 will interface with PeopleSoft™ system 504 (step 402) and will feed PeopleSoft™ data onto the BTL engine 506 through its Java Subscriber 512 (step 404). The BTL engine 506 will generate a MessageContext object containing the PeopleSoft™ data and it will pass it on to the first BTL handler defined in the configuration file that in this case is the sample template handler 530 (step 406). The template handler 530 will process and transform the MessageContext object and it will pass it on to next handler in the chain. The XSL files handler 532 receives the MessageContext and applies a chain of XSL Transformations, e.g., PSCAMA.XSL and sample.XSL (step 408).

The BR handler 534 receives the MessageContext object and transforms it executing any decision tables defined in the configuration file (step 410), via the configuration GUI 516. Then, it will pass it on to the mapping handler 536. The mapping handler 536 receives the MessageContext object and transforms it assigning PeopleSoft™ data fields and custom fields to Global User attributes based on the mapping information in the configuration file (step 412). Then it will pass it on to the generic component handler 538. The generic component handler or end point handler (Dirsync Handler) will ultimately generate eTrust™ Admin Workflow requests (step 414), via the workflow engine 514. This request(s) will lead towards the provisioning, modification or de-provisioning of Global user and all associated accounts in the eTrust™ Admin application 508.

The system and method according to embodiments of the present invention provides organizations the ability to capture changes to a source application, e.g., a PeopleSoft™ application, in real time. The system and method transforms the data into “intelligible” user provisioning requests based on business rules associated with specific values in the source application data. The system and method then submits these requests via a workflow engine to a user provisioning engine, e.g., a target application, which ultimately sends (create, delete, or modify) requests to managed security systems. In summary, embodiments of the present invention automate the user provisioning process from a source application to the heterogeneous security systems making up the organizations IT infrastructure.

While the invention has been shown and described with reference to certain preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and detail may be made therein without departing from the spirit and scope of the invention as defined by the appended claims.

WHAT IS CLAIMED IS:

1. An interface module for integrating data from a source application to a target application comprising:

a publisher for publishing extracted data from the source application in at least one XML message; and

a subscriber for uncompressing the at least one XML message.

2. The interface module as in claim 1, wherein the publisher includes a full data replication mechanism for initially publishing the entire content of the source application.

3. The interface module as in claim 2, wherein the publisher includes an incremental updates mechanism for publishing changes made to the source application after initial publication.

4. The interface module as in claim 3, wherein the publisher filters effective-dated data and publishes active data.

5. The interface module as in claim 1, wherein the subscriber is a Java subscriber.

6. The interface module as in claim 1, wherein the subscriber further includes an EDI (Electronic Data Interchange) engine for uncompressing the at least one XML message when a number of XML messages is greater than a first predetermined threshold.

7. The interface module as in claim 1, wherein the subscriber transforms data from a source application format to a target application format.

8. The interface module as in claim 1, further comprising a message node for pointing the publisher to the subscriber.

9. A method for integrating data from a source application to a target application, the method comprising the steps of:

publishing an XML message of user data from the source application;

receiving, decoding and uncompressing the XML message; and

transforming the XML message into a workflow request for integrating the source data to the target application.

10. The method as in claim 9, wherein the publishing step includes querying all records of user data of the source application and publishing an entire copying of the records.

11. The method as in claim 10, wherein the publishing step includes querying all records of user data of the source application and publishing incremental changes relative to initial records.

12. The method as in claim 10, further comprising the step of defining records and fields of the records of the user data to be published.

13. The method as in claim 10, further comprising the steps of filtering effective-dated user data and publishing active data.

5 14. A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform method steps for integrating data from a source application to a target application, the method steps comprising:

publishing an XML message of user data from the source application;

receiving, decoding and uncompressing the XML message; and

10 transforming the XML message into a workflow request for integrating the source data to the target application.

15 15. The program storage device as in claim 14, wherein the publishing step includes querying all records of user data of the source application and publishing an entire copying of the records.

16. The program storage device as in claim 14, wherein the publishing step includes querying all records of user data of the source application and publishing incremental changes relative to initial records.

20 17. The program storage device as in claim 14, further comprising the step of defining records and fields of the records of the user data to be published.

18. The program storage device as in claim 14, further comprising the steps of filtering effective-dated user data and publishing active data.

1/5

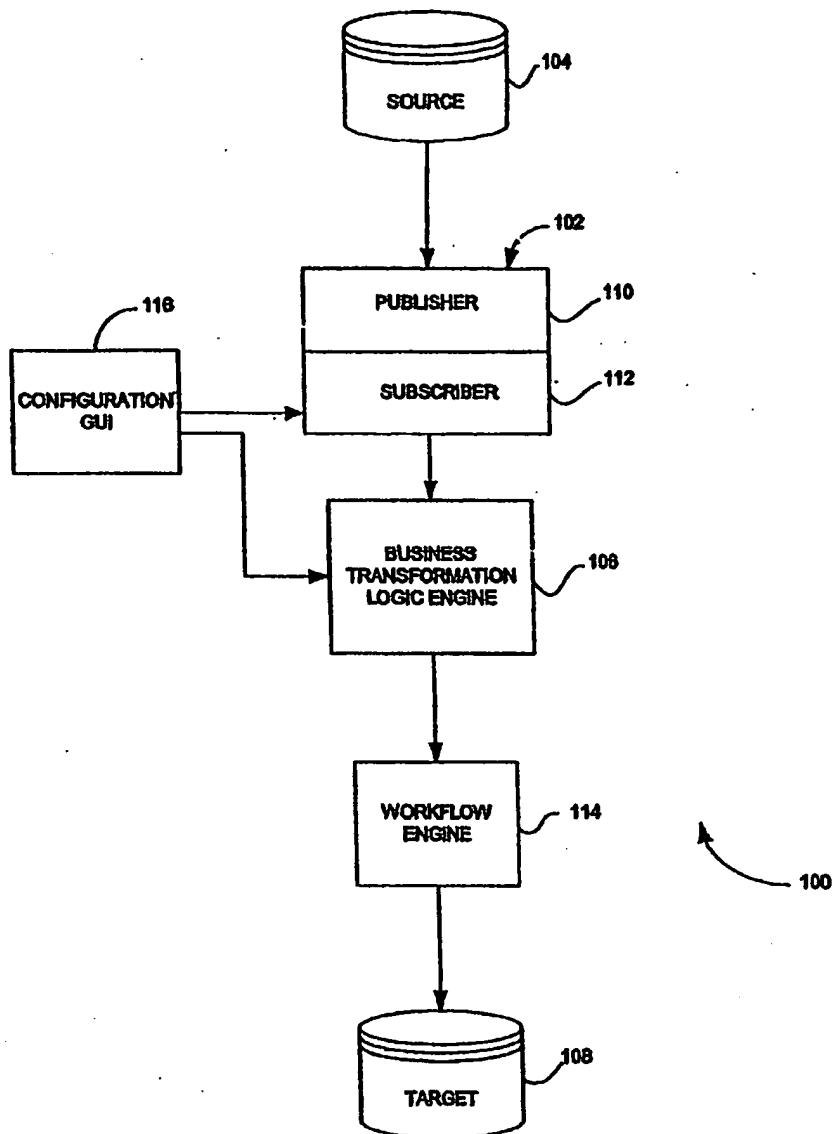


FIG. 1

2/5

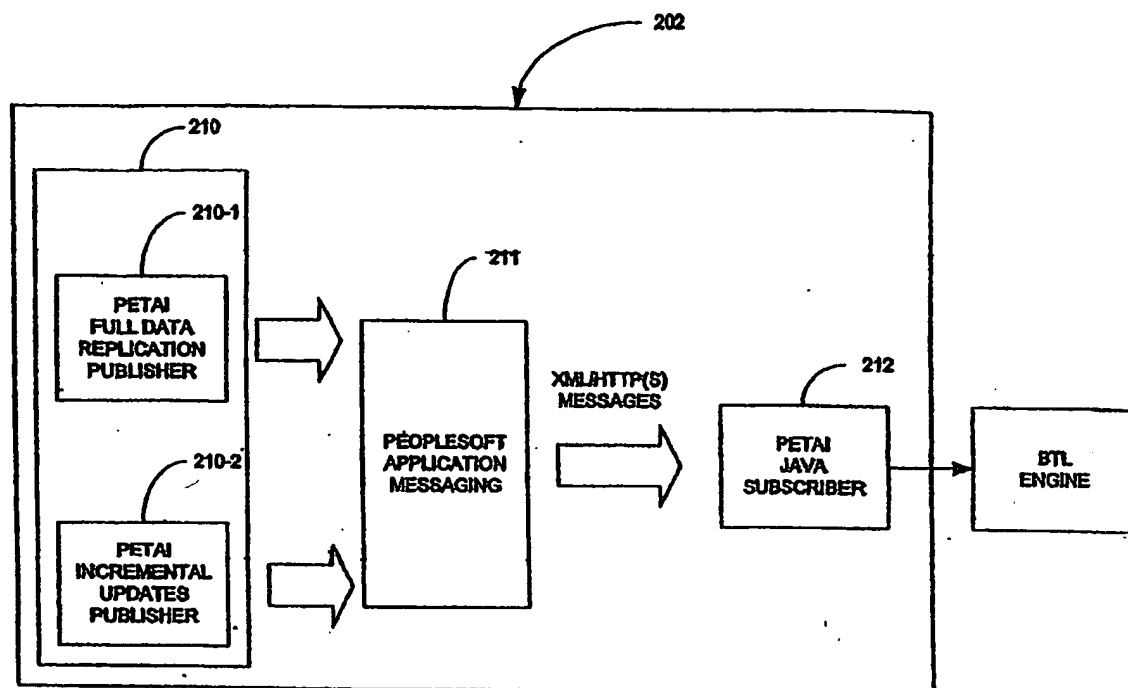


FIG. 2

3/5

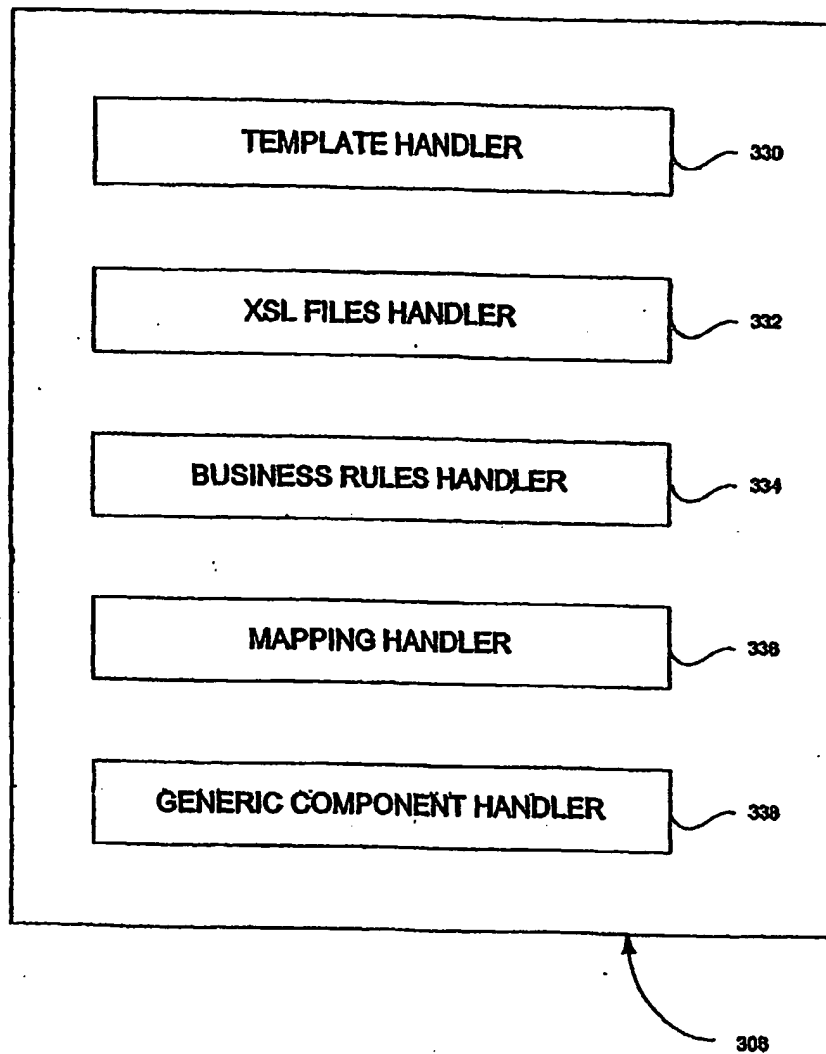


FIG. 3

4/5

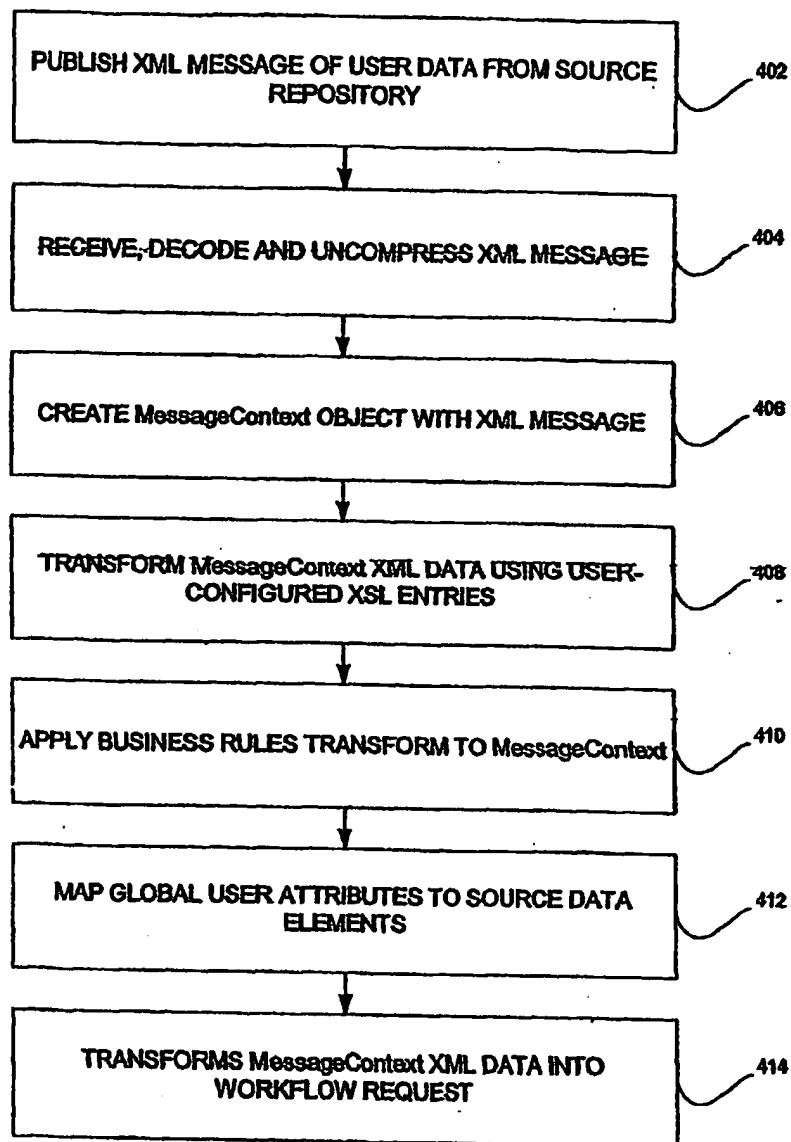


FIG. 4

5/5

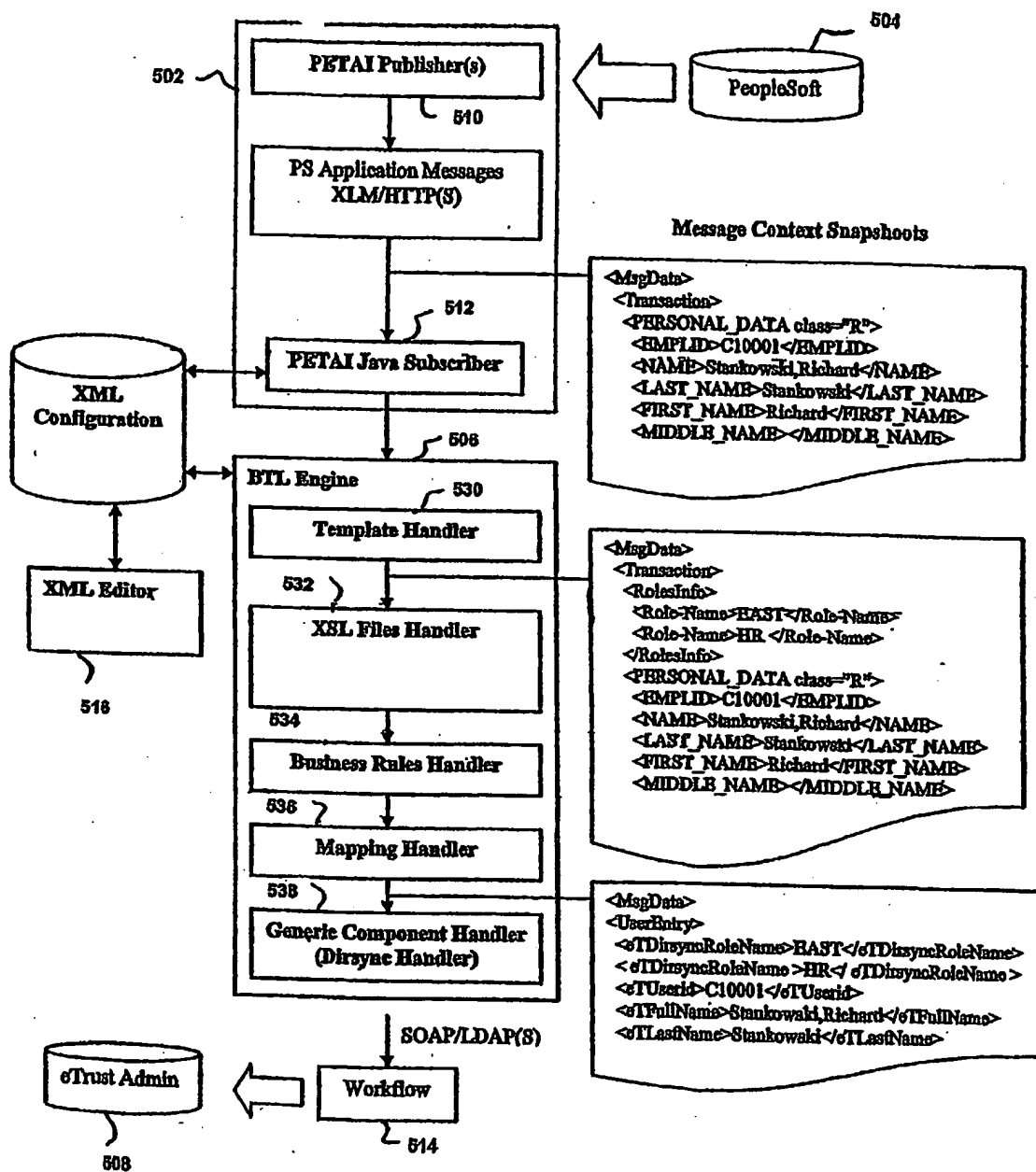


FIG. 5

SUBSTITUTE SHEET (RULE 26)

INTERNATIONAL SEARCH REPORT

PCT/US2004/022148

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 606F17/30				
According to International Patent Classification (IPC) or to both national classification and IPC				
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC 7 606F				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	NOVELL: "DirXML Administration Guide" DIRXML 1.0 DOCUMENTATION, 'Online! November 2000 (2000-11), pages 1-104, XP002309370 Retrieved from the Internet: URL: http://www.novell.com/documentation/dirxml10/pdfdoc/dirxml/dirxml.pdf 'retrieved on 2003-10-30!	1-3, 5-12, 14-17		
Y	page 10, line 9 - page 12, line 25 page 13, lines 10-30 page 30, lines 11-32 page 34, line 1 - page 35, line 10 page 42, line 17 - page 51, line 21 -/-	4, 13, 18		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input type="checkbox"/> Patent family members are listed in annex.				
* Special categories of cited documents : <table border="0"> <tr> <td> "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed </td> <td> "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone. "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "Z" document member of the same patent family </td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone. "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "Z" document member of the same patent family
"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone. "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "Z" document member of the same patent family			
Date of the actual completion of the international search 7 December 2004		Date of mailing of the international search report 21/12/2004		
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3016		Authorized officer Bykowski, A		

INTERNATIONAL SEARCH REPORT

PCT/US2004/022148

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>NOVELL: "Novell DirXML Administration Guide" DIRXML 1.1 DOCUMENTATION, 'Online! January 2002 (2002-01), pages 1-224, XP002309371 Retrieved from the Internet: URL:http://www.directory-info.com/DirXML/dirxmlAdmin.pdf> 'retrieved on 2004-11-24! page 15, lines 16,17 page 16, lines 8-20 page 17, line 1 - page 20, line 10 page 22, line 20 - page 32, line 2 page 51, lines 5-9; figure 5 page 55, lines 1-10 page 70, lines 6-30 page 74, lines 9,10</p>	1-3, 5-12, 14-17
Y	<p>DAVE MUSICANT, MIHAELA PATRICIA DABU: "Efficient Storage of Temporal Data in a Data Warehousing Context" 'Online! 1997, pages 1-32, XP002309372 Retrieved from the Internet: URL:http://www.cs.wisc.edu/{musicant/effstor.ps> 'retrieved on 2004-12-08! page 9, right-hand column, last line - page 10, left-hand column, line 16</p>	4,13,18
X	<p>NOVELL: "Introduction to DirXML" NOVELL TUTORIAL, 'Online! 2002, pages 1-116, XP002309373 Retrieved from the Internet: URL:http://developer.novell.com/education/tutorials/introdirxml/introDirXML.pdf> 'retrieved on 2004-12-06! the whole document</p>	1-3, 5-12, 14-17